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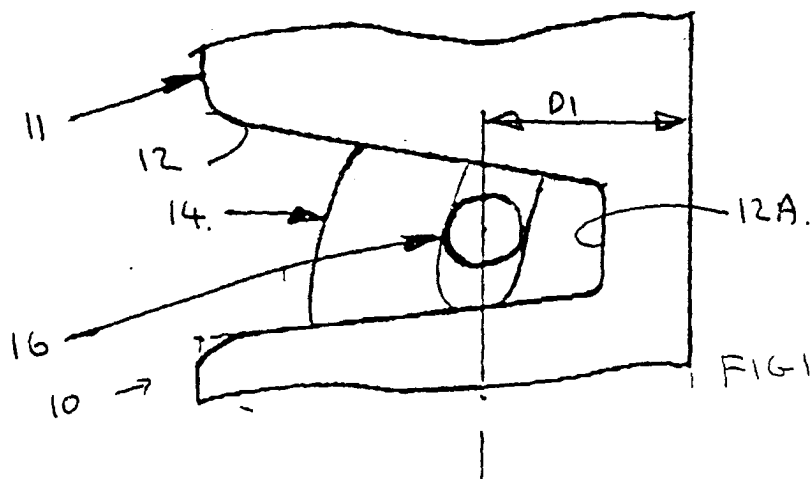
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(54) **Latch mechanism**

(57) A latch mechanism (10) being lockable and having a latch bolt (14) for engagement with a striker (16), the latch bolt having at least an open condition for

releasing the striker, a closed condition for retaining the striker and an impact over travel closed condition in which movement of the latch bolt to the impact over travel closed condition causes locking of the latch.



EP 1 067 262 A1

Description

[0001] The present invention relates to latch assemblies and in particular latch assemblies for releasably securing vehicle doors such as car doors in a closed position.

[0002] When known latch assemblies are used on car doors, and the car has subsequently been involved in a road accident where the door has been deformed, the very act of deforming the door has been known to cause the latch assembly to unlatch and allow the door to open.

[0003] It is generally recognised that passengers within a vehicle which is involved in an accident are safer if they remain inside the vehicle. Thus an open door allows a passenger to fall out increasing the chance of injury. Furthermore the structural rigidity of a passenger cell of a vehicle is enhanced if all doors remain shut.

[0004] It is an object of the present invention to provide a latch assembly which is less likely to unlatch during an accident.

[0005] Thus according to the present invention there is provided a latch mechanism being lockable and having a latch bolt for engagement with a striker, the latch bolt having at least an open condition for releasing the striker and a closed condition for retaining the striker, and an impact over travel condition in which movement of the latch bolt to the impact over travel condition causes locking of the latch.

[0006] The invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figures 1, 2 and 3 are successive views of a latch mechanism according to the present invention shown in a closed position, a slam over travel position and a impact over travel position respectively; and

Figures 4 and 5 are views equivalent to figures 1 and 3 with the retention plate of the latch mechanism removed for clarity.

[0007] With reference to the drawings there is shown a latch mechanism 10 mounted on a car door (not shown) the latch mechanism includes a retention plate 11 having a mouth 12 with a mouth end 12A. Pivotaly mounted via pivot 15 situated on the retention plate 11, is a latch bolt in the form of a rotating claw 14.

[0008] Claw 14 is planar and includes an abutment in the form of a cam surface 20 and a jaw 21 for releasably retaining a striker 16.

[0009] The latch mechanism 10 further includes a lock lever 18 pivotaly mounted via pivot 19 on the retention plate 11.

[0010] Claw 14 can be retained in a closed position as shown in figures 1 and 4 by a pawl (not shown) thus securing the striker 16, which is mounted on fixed structure of a vehicle, such as a B post or C post of a car.

[0011] Actuation of the pawl allows the claw to rotate anticlockwise when viewing figures 1 and 4 thus releasing the striker and allowing the door to open.

[0012] Typically the door includes elastomeric weather seals which are compressed when the door is in the closed position to exclude rain water, dirt and the like from the interior of the vehicle.

[0013] When the door is slammed shut it momentarily travels past its closed position to a slam over travel position as shown in figure 2 causing the bolt to rotate to its slam over travel position. Under these circumstances the pawl engages with the claw and the weather seals return the door to its closed position (note that slam datum distance D2, showing the relative position of the door and striker, is smaller than datum distance D1).

[0014] Depending on how hard the door is slammed depends upon how much the door over travels its closed position, but there is a slam limit beyond which the door cannot pass simply by slamming alone.

[0015] However in the event of a side impact on the door, the forces involved are far greater than those associated with heavy slamming and the door achieves a impact over travel position as best shown in Figure 3 which in this case is when the striker 16 contacts mouth end 12A of the retention plate (note impact datum distance D3 is smaller than slam datum distance D1).

[0016] Thus when the door is in its impact over travel position the latch is similarly in its impact over travel position and the claw is similarly in its impact over travel position.

[0017] With the claw in its open position cam surface 20 does not engage lock lever 18. Normal slamming of the door causes the claw to rotate initially to the position shown in figure 2 and then spring back to the position shown in figures 1 and 4 under the influence of the weather seals, but at no time does the cam surface contact lock lever 18. Even when the door is at its slam limit over travel position the cam surface 20 does not contact lock lever 18.

[0018] Under road accident crash conditions, when the door achieves an impact over travel condition the claw 14 moves to the position as shown in figure 5 which results in cam surface 20 engaging lock lever 18 and moving it from its unlocked position U (see figure 4) to its locked position L (see figure 5) thus locking the latch mechanism.

[0019] Clearly in the event of the lock lever being in its locked position prior to the crash, the lock lever will remain in the locked position after the crash.

[0020] In the event of only light damage to the door, the weather seals will return the door and the latch mechanism to its normal closed position where upon the door can be unlocked and opened following the road accident.

[0021] It should be noted that the invention is not limited to latch bolts in the form of rotating claws.

[0022] It should also be noted that a car door can be locked whereby operation of an outside door handle

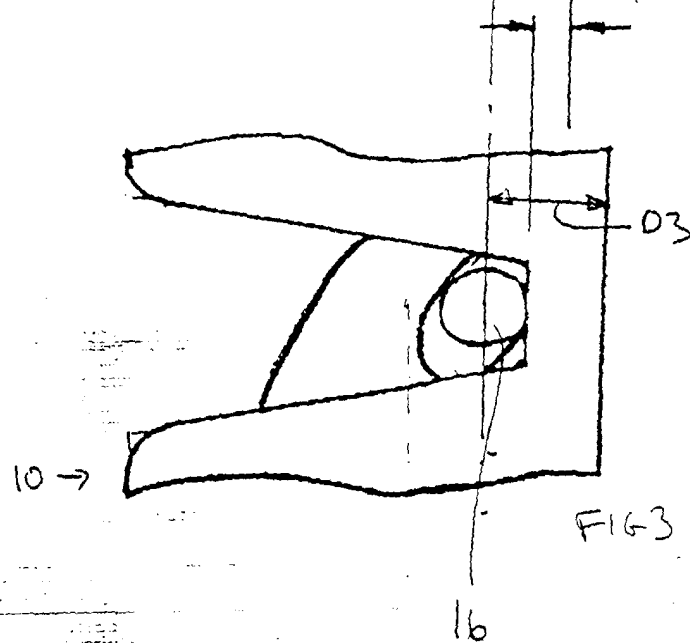
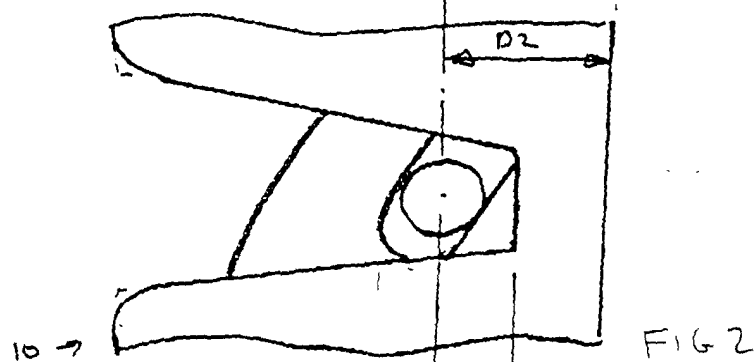
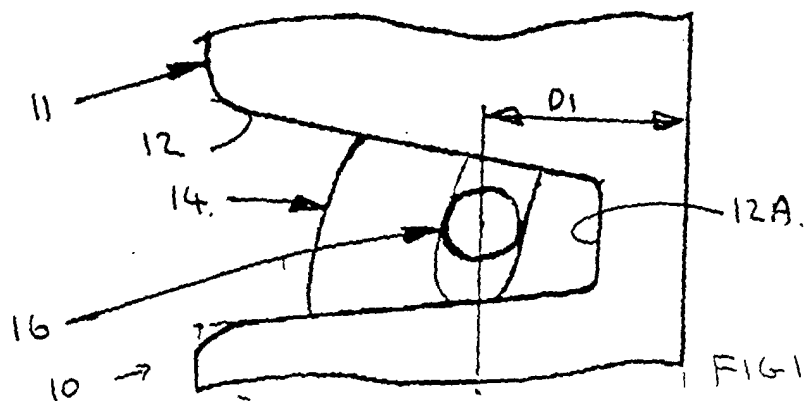
does not open the latch, or whereby operation of an inside door handle does not operate the latch (also known as a child safety condition) or the door can be locked such that operation of either the outside or inside door handle does not operate the latch (known as a super locked or dead locked condition) and the present invention is applicable to all these types of locking.

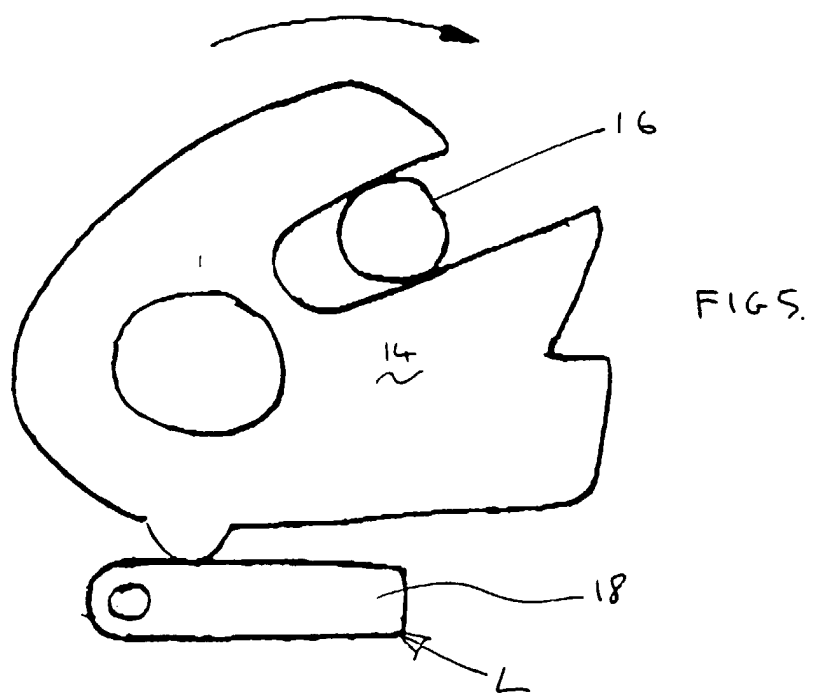
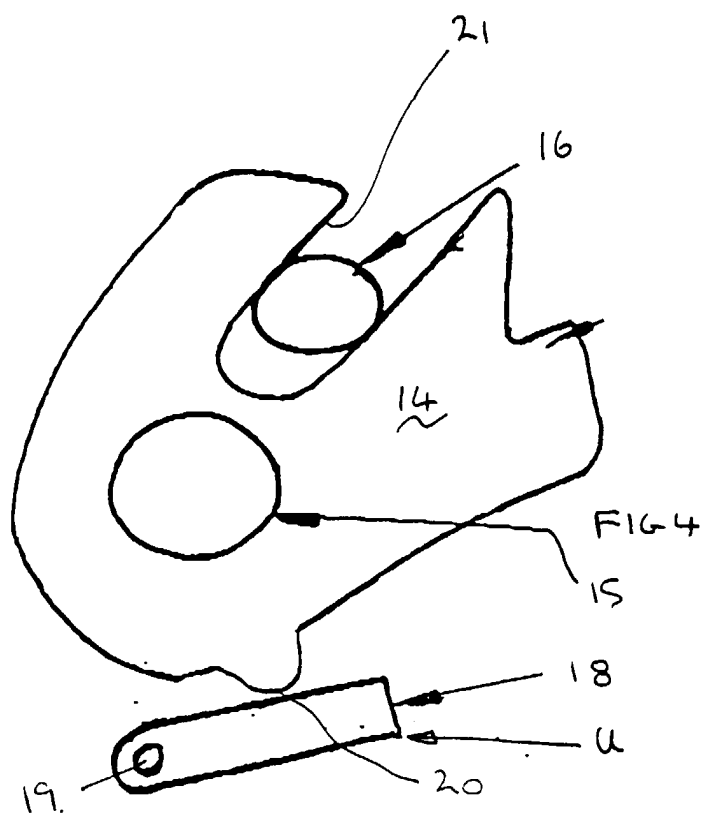
[0023] Furthermore locking can be effected by providing a break between a door handle and the claw such that the door handle 'free wheels' without opening the latch, or locking can be provided by creating a block between the door handle and claw such that the block prevents movement of the door handle and the present invention is applicable to 'break' or 'block' type locking. The lock lever 18 can either provide such a break or block directly or can act on further levers or the like which themselves provide the break or block.

means are situated in the door.

Claims

1. A latch mechanism being lockable and having a latch bolt for engagement with a striker, the latch bolt having at least an open condition for releasing the striker, a closed condition for retaining the striker and an impact over travel closed condition in which movement of the latch bolt to the impact over travel closed condition causes locking of the latch.
2. A latch mechanism as defined in claim 1 in which an abutment of the latch bolt operably causes locking of the latch.
3. A latch mechanism as defined in claim 2 in which the abutment is a cam surface of the latch bolt.
4. A latch mechanism as defined in any preceding claim in which the latch bolt is a rotating claw.
5. A latch mechanism as defined in claim 4 in which the rotating claw is substantially planar.
6. A latch mechanism as defined in claim 5 when dependent upon claim 2, in which the abutment is a projection of the claw in the same plane as the claw.
7. A vehicle including a door being securable in a closed position by a lockable latch mechanism having a latch bolt for engagement with a striker, the latch bolt having at least an open condition for releasing the striker, and a closed condition for retaining the striker, in which the vehicle has first means (18,20) for detecting abnormal loadings applied to the vehicle, such as occurs during a road traffic accident, and second means for locking the latch mechanism.
8. A vehicle as defined in claim 7 in which the first







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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 5755

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
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A	* column 1, line 59 - column 2, line 2 * * column 5, line 14 - line 50; claim 8; figures 3,4 *	7,8		
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Place of search		Date of completion of the search	Examiner	
THE HAGUE		18 October 2000	PEREZ MENDEZ, J	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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